AMENDMENT

In the Claims:

Please amend claims 1-2, 4-7 as follows:

1. (Once Amended) A high power output vacuum electron device comprising:

a cathode for emitting a supply of electrons,

an anode for attracting said electrons, said anode having a configuration to allow said electrons to pass through said anode,

an RF generator circuit in the path of said electron beam for generating RF signal energy in the presence of a high-voltage power source,

a magnet surrounding said anode and said RF generation circuit for focusing said electrons into a collimated beam, and

a collector for receiving the collimated electron beam and for returning the electrons to the cathode, said collector is a multi-stage depressed collector which is shielded from the magnetic field from said magnet, said magnet only disposed at an end of said anode opposite to said collector.

2. (Once Amended) The vacuum electron device of Claim 1 wherein said collector defined by a region which is free of any magnetic fields such that the electron beam naturally disperses to evenly deposit said electrons on inner walls of said collector, said collector being thereby free of hot spots due to uneven electron deposition thereon.

3. (Not Amended) The vacuum electron device of Claim 1 wherein said collector is free of magnetic flux reversals from said magnet such that the electron beam evenly disperses on said collector.

4. (Once Amended) A vacuum electron device including a source of electrons, said electrons being configured into a narrow beam, and a multi-stage depressed collector for collecting said electrons, the improvement comprising:

a magnet surrounding and focusing said narrow beam, the magnetic flux of said magnet being parallel to and collinear with the centerline of said electron beam, said magnet having open pole pieces along said centerline to focus and drive said electron beam, said magnet having open pole pieces adjacent to the area of said source of electrons to initially focus said electron beam, said magnet having no open pole pieces in the vicinity of said multi-stage depressed collector so that any magnetic flux from the magnet is directed back into the body of said magnet.

5. (Once Amended) The vacuum electron device of Claim 4 wherein said multi-stage depressed collector includes an internal chamber, said electrons evenly dispersing within said internal chamber thereby eliminating any hot spots due to magnetically focused electrons.

6. (Once Amended) The vacuum electron device of Claim 5 wherein each of said stages is connected to a different high-voltage supply such that electrons of different kinetic energies will impinge on the associated depressed collector.

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~~7. (Once Amended) A gun only magnet utilized in a multi-stage depressed collector high-energy vacuum electron device comprising:~~

~~a first pole piece region generating magnetic flux adjacent a cathode of said vacuum electron device to drive and initially focus electrons emitted from said cathode, and~~

~~a second pole piece region providing magnetic flux along the path of electrons to focus said electrons into a narrow beam, said magnet having no pole piece in the region of said vacuum electron device where the electrons are collected and returned to said cathode.~~

In the Specification:

The paragraph beginning at page 5, line 16 has been replaced with the following paragraph:

A2

Figure 5 is a drawing simulation of electrons entering the collector region in the presence of a magnetic field reversal for a system as set forth in conjunction with Figure 1 in accordance with a prior art;

The paragraph beginning at page 7, line 7 has been replaced with the following paragraph:

A3

The klystron tube 100 in Figure 10 is a device for amplifying signals 102 at microwave radio frequencies. The high velocity electron beam emitted from the cathode 104 passes through the anode 106 and into the RF interaction region 108. An external

magnetic field is employed to prevent the beam from spreading as it passes through the klystron. Magnet 150 supplies the strong magnetic field 152, 154 in a clockwise direction as Figure 10 is viewed. Magnet 150 is cylindrical and surrounds parts of the cathode, anode, and parts of the collector, but only a top section view of the magnet is shown for clarity. A return plate 153 connects both magnetic fields 152 and 154. At the other end of the klystron, the electron beam impinges on the collector electrode 120, which dissipates the beam energy and returns the electron current to the beam power supply 122.

The paragraph beginning at page 10, line 11 has been replaced with the following paragraph:

In an ideal situation, the electron flow 124 enters the collector chamber 138 of the collector 120 with a centerline (CL) as seen in Figure 8. As the electrons enter the chamber 138 and the magnetic field is removed, the natural electrostatic repulsion of the electrons will cause them to scatter to impinge upon the walls 139 evenly as shown internally of the chamber in Figure 8. The fins 140 are shown for cooling, with air 142 forced over the fins 140 to remove the heat caused by the energy of the impinging electrons being converted from kinetic energy to heat energy.

The paragraph beginning at page 10, line 18 has been replaced with the following paragraph:

-- In an actual collector for a klystron, there is normally some extraneous magnetic field action within the chamber 138 defined internally of the collector 120 with

a centerline (CL) as seen in Figure 9 no matter how effective the shielding. Figure 9 illustrates the walls 139 of the chamber 138. The fins 140 are also shown for cooling, with air 142 forced over the fins 140 to remove the heat caused by the energy of the impinging electrons being converted from kinetic energy to heat energy. While it is not intended generally for the chamber 138 of the klystron collector 120 to be affected by the magnetic field, the prior art has not been successful in eliminating the effects of the magnetic flux reversal at the point where the electron beam enters the chamber 138 of the collector 120. The electron path 124 in Figure 9 does not result in a pure fan shaped dispersion of the electron beam as seen in Figure 8, but the electrons have a tendency to be refocused again within the collector chamber 138 by the flux reversals of the magnetic field, although unintended. Figure 9 shows that the electron beam 124 become refocused electron beams 125 in the collector 120. The refocused electron beam 125 are collected in a smaller area of the chamber, shown to be accumulated at the inner end of chamber 138. With the electrons impinging on the collector in a smaller area, a designer must take into effect the possibility of hot spots caused by an over abundance of impinging electrons in that one area. --

Cont'd a5

The paragraph beginning at page 12, line 1 has been replaced with the following paragraph:

a6

-- Figure 1 shows a conventional permanent magnet arrangement 10 for use in a typical klystron tube. The line 12 at the bottom of Figure 1 is actually the centerline (CL) of the magnet depicted. That is, the magnet 10 shown in Figure 1 is actually circular about the centerline with only a plan section view of one-half of the magnet illustrated.

Cont'd A6

The vertical axis of Figure 1 represents the dimension or radius (R) of the magnet 10. On the left side of the magnet is the area 14 of the magnet that is used to initially begin the focusing of the electron beam into a narrow pencil beam. The direction of the magnetic field at the area of the magnet adjacent the gun magnet 16 is toward the bottom of the magnet with the magnetic fields returning in the drawing to the other pole of the magnet at the top of Figure 1. The electrons are confined along the centerline 12 of the high-energy tube by the magnetic flux field allowing for improved energy recovery of the electron beam. --

The paragraph beginning at page 13, line 11 has been replaced with the following paragraph:

A7

-- Figure 3 shows a similar drawing to that of Figure 1, except now there is magnetic material at the collector region 30 of the permanent magnet 32. The permanent magnet 32 has a magnetic field 18 which traverses the opening 20 at the area where the electron beam is modulated. This magnetic material eliminates the effects of any flux reversal which appeared and was described above conjunction with Figures 1 and 2. In Figure 3, the magnetic field lines are terminated into the magnetic metal of the magnet at collector region 30. --

<u>In the Drawings:</u>

Corrected drawings FIG. 1-7, 9-10 are submitted herewith for approval. Corrections are indicated in red ink.